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| 10/620,461      | 07/17/2003  | Takeshi Misawa       | 0649-0901P          | 9184             |

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EXAMINER

MAGEE, THOMAS J

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2811

DATE MAILED: 04/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/620,461

Applicant(s)

MISAWA, TAKESHI

Examiner

Thomas J. Magee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Rejections – 35 U.S.C. 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 5, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Hamada (US 5,453,876).

3. Regarding Claims 1, 5, and 8, Hamada discloses a semiconductor device comprising a semiconductor substrate (31) (Figure 3a) having a front and rear surface in which a photoelectric converting portion (CCD) is formed (Col. 1, lines 23 – 26) on the front surface. Hamada further discloses a light shading film (layer) Figure 3a) (Col. 5, lines 66 – 67) at the back (rear) surface of the substrate (31) for shading light from the device.

### ***Claim Rejections – 35 U.S.C. 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art

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are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada, as applied to Claims 1, 5, and 8, and further in view of Iijima et al. (US 6,782,610 B1).

6. Regarding Claim 2, Hamada does not disclose a wiring board with a terminal formed on the rear surface. Iijima et al. disclose (Col. 17, lines 35 – 42) (Figure 27C, 38) (Figure 27D, 39) the presence of connecting terminals at the rear surface of a wiring board, wherein a device (11) is attached to the board (Figure 28A) at the front of the board. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine Iijima et al. with Hamada to form a completed working device.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada, as applied to Claims 1, 5, and 8, and further in view of Vandamme et al. (US 6,200,908 B1).

8. Regarding Claim 3, Hamada does not disclose that the light shading (scattering) means is a rough surface area. Vandamme et al. disclose that grinding/finishing of the back surface of a wafer (Col. 1, line 64 through Col. 5, line 7) produces surface roughness that results in high light scatter from the surface (Col. 7, lines 53 – 59). Hence it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Vandamme et al. with the device of Hamada to obtain a sensor with improved light scattering properties at the back surface.

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9. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada, as applied to Claims 1, 2, 5, and 8, and further in view of Wheatley et al. (US 5,122,905)

10. Regarding Claim 4, Hamada does not disclose the presence of one or more "light shading films having different refractive indices and formed on the rear surface of the substrate, corresponding to the photoelectric converting portion. Wheatley et al. disclose a multilayered film body formed on the rear surface of a substrate (Figure 2) in which the refractive index difference between the first two layers is 0.03, and arranged such that at least 30% of the incident light is reflected, producing a diffuse or shaded surface. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the multifilm structure of Wheatley et al. at the back surface of the device of Hamada to produce a device with a diffuse or light shaded region at the rear of the device within regions of the photoelectric converting portion to avoid spurious signals in the sensor.

11. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada, as applied to Claims 1, 5, and 8, and further in view of Fjelstad (US 6,583,444 B2).

12. Regarding Claim 6, Hamada does not disclose that the wiring board is connected to the substrate through a light-shading resin material. Fjelstad discloses that a light sensitive device is contained using an epoxy resin (Col. 7, lines 33 – 38) that is "opaque" (Col. 7, lines 43 – 45) to visible light, wherein the resin serves as a light-shading material. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine Fjelstad

with Hamada to obtain a resin adhesive material to attach the substrate and circuit board together.

13. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada as applied to Claims 1, 5, and 8, and further in view of Tamaki (US 5,523,174).

14. Regarding Claim 7, Hamada does not disclose that the surface of the wiring board is roughened. Tamaki discloses (Figure 2) that the surface of the printed circuit board is roughened to improve adhesion at the surface. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine Tamaki et al. with Hamada to obtain an increased bonding at the interface of the board and the substrate.

15. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Malinovich et al. (US 6,168,965 B1) in view of Vandamme et al.

16. Regarding Claim 9, Malinovich et al. disclose a method for manufacturing a semiconductor device comprising forming a plurality of devices (Col. 6, lines 5 –7) (Figure 3A) (100) on the front surface of a semiconductor substrate, with a bonding step for bonding a wiring board on the rear surface of the substrate (Col. 8, lines 8 – 12) and a separating step for separating individual devices (Col. 7, lines 20 – 25) (Figure 4D).

Malinovich et al. do not disclose the use of a grinding step for forming rough surface on the

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rear surface of the semiconductor substrate. Vandamme et al. disclose (Col. 3, lines 42 – 52) the use of backside grinding to form a rough surface (Figure 4) at the rear surface of the substrate. It would then have been obvious to one of ordinary skill in the art at the time of the invention to combine the back surface grind techniques of Vandamme et al. with the structure of Malinovich et al. to obtain an optical device with a “light shading” or diffuse scattering layer to avoid spurious signals being reflected back into the sensor at the front surface.

17. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Malinovich et al. in view of Fjelstad.

18. Regarding Claim 10, Malinovich et al. disclose a method for manufacturing a semiconductor device comprising the steps of forming a plurality of devices (Col. 6, lines 5 – 7) (Figure 3A) (100) on the front surface of a semiconductor substrate, and a separating step for separating individual devices (Col. 7, lines 20 – 25) (Figure 4D).

Malinovich et al. do not disclose the use of a light shading adhesive for bonding a wiring board on the rear surface of a semiconductor device, wherein the adhesive suppresses light “reflected” (scattered) from the semiconductor rear surface. Fjelstad discloses that a light sensitive device is contained using an epoxy resin (Col. 7, lines 33 – 38) that is “opaque” (Col. 7, lines 43 – 45) to visible light, wherein the resin serves as a light-shading material. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine Fjelstad with Malinovich et al. to obtain a resin adhesive material to attach the substrate and circuit board together.

### ***Response to Arguments***

19. Applicant's arguments with respect to claims have been considered but these have been found to be moot in view of the new ground(s) of rejection.

Commentary on teachings in Figs. 6(A) – 6(I) (p.8, Response) are not germane, since this is another embodiment to which Examiner has not referred.

With respect to Claim 10, comments regarding the combination of Malinovich et al. and Fjelstad are not correct. Fjelstad discloses that a number of adhesives are commonly known in the art, such as epoxy resin, silicone resin or other plastic encapsulants (Col. 7, lines 33 – 37). The resin is definitely opaque (Col. 7, lines 40 – 43) on the substrate, as is the case for a number of adhesives. Malinovich et al. discloses an epoxy layer (Col. 6, lines 40 – 43) on the substrate.

In light of the above, the rejection is maintained.

### ***Conclusions***


20. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to **Thomas Magee**, whose telephone number is **(571) 272 1658**. The Examiner can normally be reached on Monday through Friday from 8:30AM



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to 5:00PM (EST). If attempts to reach the Examiner by telephone are unsuccessful, the examiner's supervisor, **Eddie Lee**, can be reached on **(571) 272-1732**. The fax number for the organization where this application or proceeding is assigned is **(703) 872-9306**.

Thomas Magee  
March 23, 2005



EDDIE LEE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800